

TERRESTRIAL MITES OF NEW YORK—VI. FURTHER
NOTES ON TARSONEMIDAE (ACARINA)¹

Mercedes D. Delfinado

Abstract.—Twenty-one species of *Tarsonemus* known from New York are keyed. Five new species are described and illustrated: *Tarsonemus acerbilis* and *T. edwardi* found associated with eriophyid mites in galls, and *T. blakemorei*, *T. socius* and *T. vulgaris* taken from bird nests and stored grain. Five tarsonemid mites previously reported from nest habitat are newly recorded from stored grain; these are: *T. ascitus* Delfinado, *T. confusus* Ewing, *T. granarius* Lindquist, *T. imitatus* Delfinado and *T. waitei* Banks.

This paper describes five new species of tarsonemid mites belonging to the genus *Tarsonemus* Canestrini & Fanzago as defined by Schaarschmidt (1959). Two of the species were found associated with eriophyid mites in galls on leaves of *Populus* sp. and *Acer saccharinum* L., and three species were collected from bird nests and stored grain. Also included in this report are five tarsonemids newly found in stored grain; these mites were previously described and reported by Delfinado (1976) from nests in New York. A key for the identification of the females of *Tarsonemus* from New York is given.

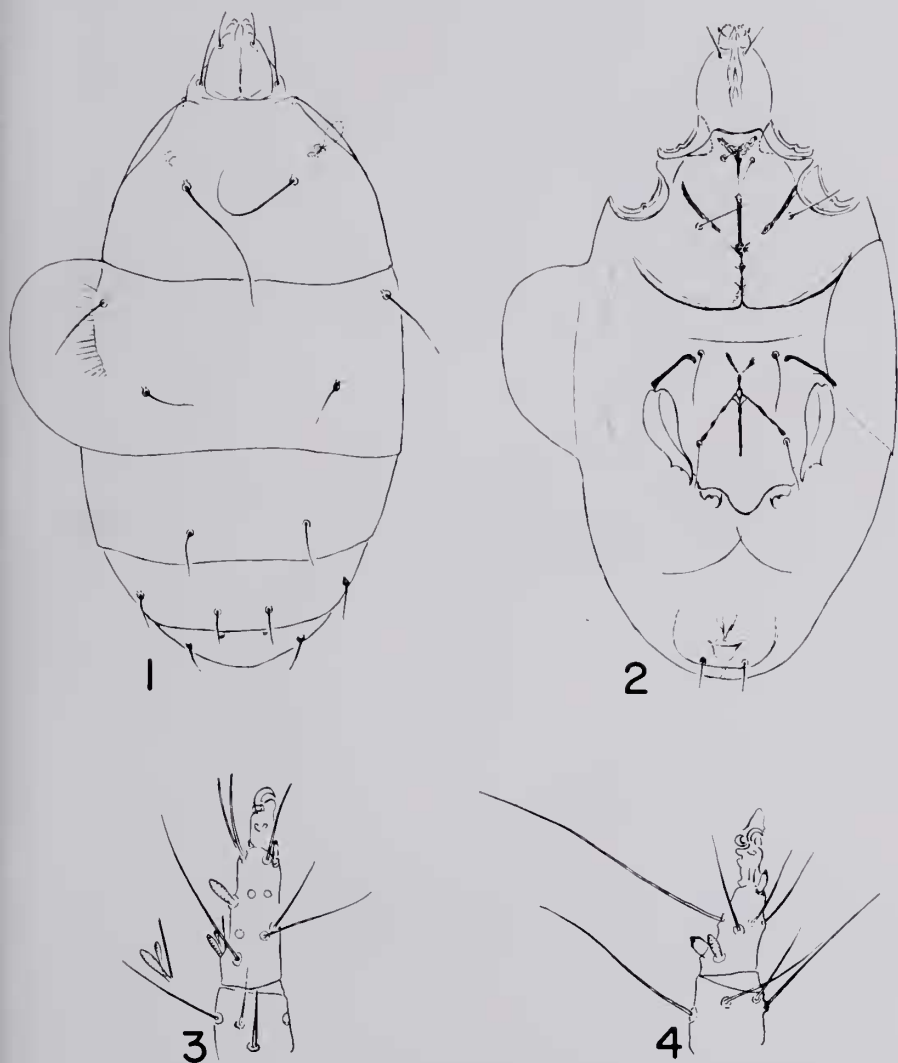
I wish to thank E. W. Baker for making the illustrations and reviewing the manuscript.

Tarsonemus acerbilis, n. sp.
(Figs. 1-13)

Female.—Length of idiosoma 230 μ , width 109 μ (holotype). Gnathosoma about as wide as long or slightly longer than wide, almost conical; dorsal and ventral setae similar in length and size; external setae lacking. Palpal external setae minute. Pharynx slender, tubular and not enlarged.

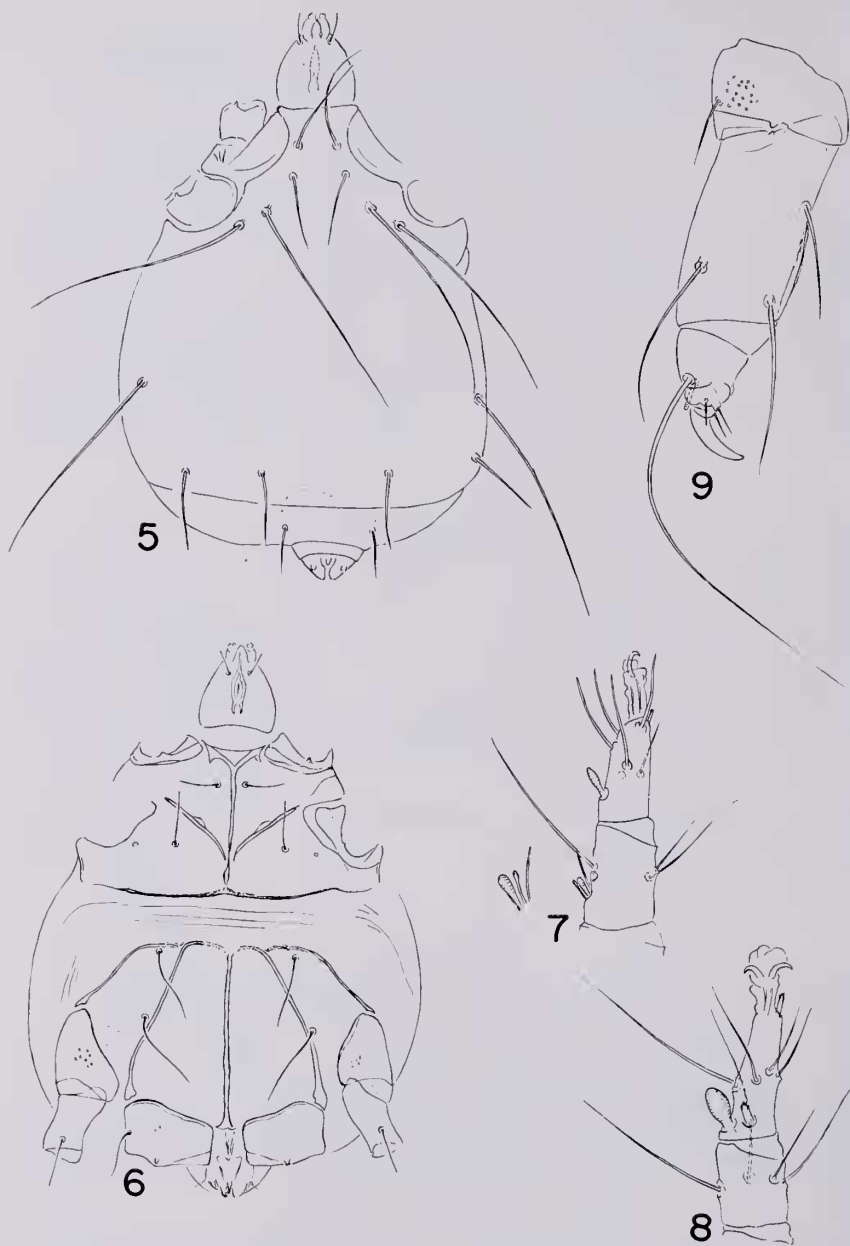
Dorsum (Fig. 1): Dorsal plates of idiosoma minutely punctate. Pseudostigmatic organs capitate, elongate oval, spiculate. Vertical setae slender and smooth, about $\frac{2}{3}$ as long as scapular setae. Scapular setae about as long as distance between their insertions. Setae of tergite I slender, with lateral pair slightly longer than dorsal pair. Setae of tergite II and dorsal setae of tergite III slender, about equal in length. Lateral setae of tergite III longer than setae of tergite IV, both pairs heavier than other setae.

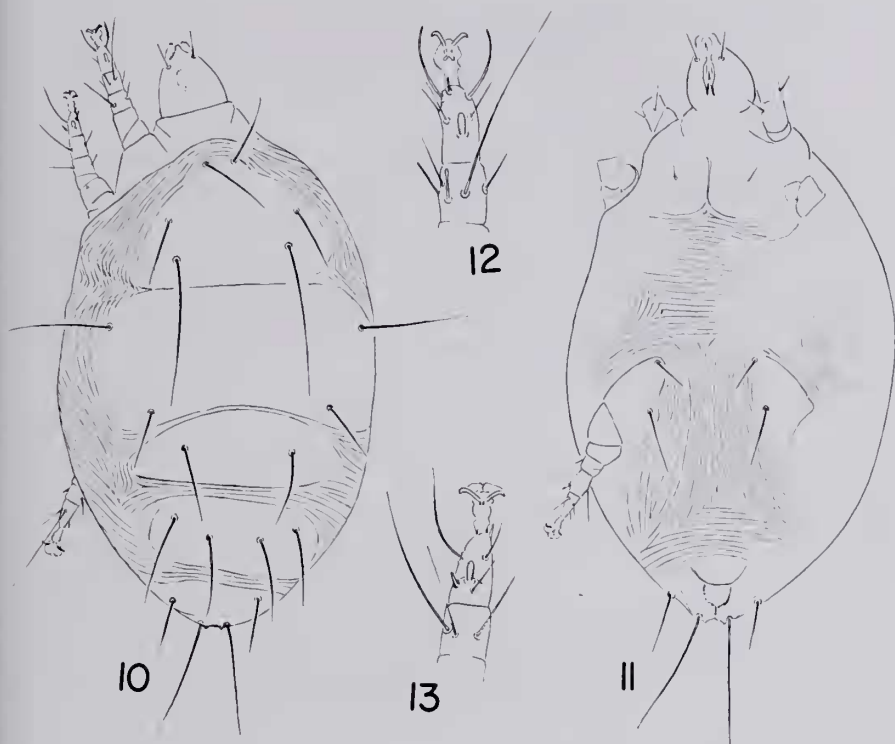
Venter (Fig. 2): Apodemes well developed. Anterior median apodeme interrupted or weakened between apodemes I and II, posteriorly weakened



Figs. 1-13. *Tarsonemus acerbilis*, n. sp., female, 1. Dorsum; 2. Venter; 3. Tibio-tarsus I; 4. Tibia and tarsus II; male, 5. Dorsum; 6. Venter; 7. Tibia and tarsus I; 8. Tibia and tarsus II; 9. Leg IV; larva, 10. Dorsum; 11. Venter; 12. Tibia and tarsus I; 13. Tibia and tarsus II.

before reaching transverse apodeme. Apodemes II slightly curved, not uniting with anterior median apodeme. Transverse apodeme strong, arcuate, not interrupted or weakened. Apodemes III extending medially near coxal setae III. Anterior end of posterior median apodeme weak, bifurcate, but





strong and straight posteriorly. Apodemes IV almost straight, weakened at junction of posterior median apodeme. All coxal setae similarly long and slender. Coxal setae I and II immediately posterior to apodemes I and II respectively. Caudal setae short, slender. Metapodosomal lobe rounded, slightly produced posteriorly.

Legs (Figs. 3, 4): Femora I and II with 4 and 2 setae respectively. Tibiotarsus I group of sensilla consisting of 1 small, clavate and 1 slender stalked capitate solenidia, and 1 long, stout pointed seta; tibiotarsal solenidion arising at distal $\frac{1}{2}$ of tibiotarsus, clavate. Tarsus II solenidion clavate, smaller than spinelike seta; spinelike seta unusually large and hyaline, with black pointed tip, laterad of solenidion. Leg IV slightly longer than combined length of femur-genu and tibia of leg III. Tarsus III shorter than tibia III. Distal ventral spine of tarsus II stout, with pointed black tip; that of tarsi I and III slender, with blunt black tips.

Male.—Length of idiosoma 179 μ , width 121 μ . Smaller than female, somewhat globular. Gnathosomal characters as in female.

Dorsum (Fig. 5): Dorsal plates minutely punctate. Propodosoma with anterior and posterior pairs of vertical setae slender, equal in length, about $\frac{1}{2}$ as long as 2 pairs of scapular setae. Both pairs of scapular setae very long, whiplike. Anterior lateral setae of metapodosoma twice as long as 2 pairs of stout posterior setae.

Venter (Fig. 6): Apodemes strongly developed. Anterior median apodeme extending posteriorly to and uniting with transverse apodeme. Apodemes II straight, uniting with anterior median apodeme near its junction with transverse apodeme. Transverse apodeme almost straight. Apodemes III and IV and posterior median apodeme united anteriorly, sometimes with weakened or interrupted areas between apodemal junctions. Posterior median apodeme straight, not bifurcate posteriorly. Coxal setae I shorter than coxal setae II-IV. Coxal setae III and IV inside coxal plates III.

Legs (Figs. 7, 8, 9): Femora I and II with 4 and 2 setae respectively. Tibia I group of sensilla consisting of 1 clavate and 1 slender stalked capitate solenidia, and 1 stout, pointed seta; distal solenidion large, clavate. Tarsus II solenidion very large, spherical; spinelike seta smaller than and laterad of solenidion. Femur IV robust, with small, rounded flange or ridge extending between 2 ventral setae; ventral setae stout and stiff, with distal seta slightly longer than proximal seta. Tibia IV with short, slender, somewhat clavate solenidion. Ventral distal spine of tarsi I-III similarly slender; tip of tarsus II spine blunt, others almost pointed.

Larva.—Idiosoma ovoid, with poorly sclerotized plates. Membranous integument striate.

Dorsum (Fig. 10): Propodosomal vertical setae as long as medial setae. Scapular setae longest of idiosomal setae. Lateral setae of tergite I about $2\frac{1}{2}$ times as long as dorsal setae, slender. Dorsal setae of tergite I and all setae of tergites II-IV fairly stout and barbed. Setae of tergite II about as long as setae of tergite III. Posterior medial pair of setae on tergite IV about $2\frac{1}{2}$ times as long as lateral pair.

Venter (Fig. 11): Propodosomal apodemes weakly developed. Hysterosomal apodemes lacking. Coxal setae I and II inside coxal plates I and II respectively; coxal setae III and IV inside coxal plates III; all setae similarly short and slender.

Legs (Figs. 12, 13): Tibia I group of sensilla consisting of 1 slender stalked solenidion and 1 stout, pointed seta; clavate solenidion lacking. Tarsi I and II solenidia slender, clavate. Spinelike seta on tarsus II small and dark tipped, laterad of solenidion.

Holotype.—Female, Schenectady, New York, 7 July 1976, in eriophyid galls on leaves of *Acer saccharinum* L., collected by E. W. Baker & M. D. Delfinado.

Paratypes.—Twenty-two females, 6 males, 3 molting larvae, with same data as holotype. The holotype and 15 paratypes are deposited in the

New York State Museum & Science Service collection at Albany; other paratypes are in the U.S. National Museum collection, and the Acarology Laboratory, Ohio State University, Columbus, Ohio.

Remarks.—*T. acerbilis*, n. sp. is readily distinguished from other gall-inhabiting tarsonemids by the following: In the female the spinelike seta of tarsus II is unusually large and hyaline with black pointed tip. In the male the solenidion of tarsus II is very large and globular, and femur IV has a small, rounded flange or ridge. The femora I and II of both sexes have 4 and 2 setae respectively. The larva differs from that of *T. edwardi*, n. sp., the other described larva, by the number of solenidia in tibia I group of sensilla: *acerbilis* has 1 solenidion and 1 seta, while *edwardi* lacks solenidia.

Tarsonemus blakemorei, n. sp.

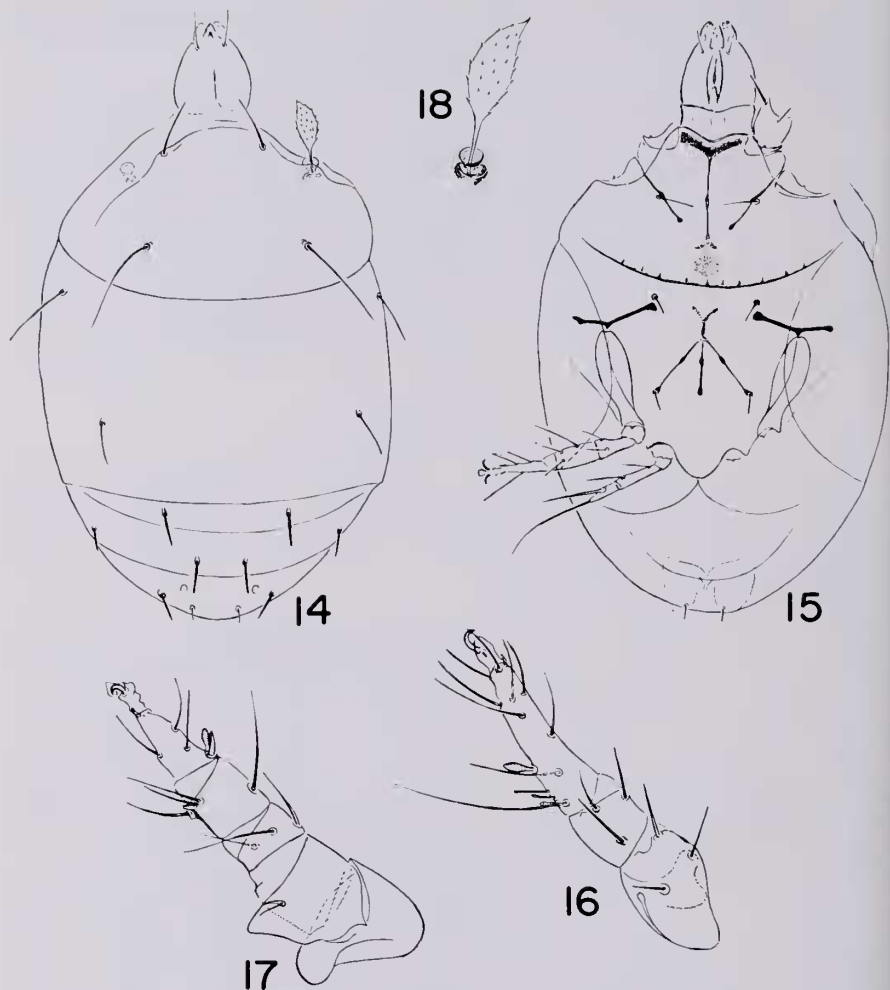
(Figs. 14–18)

Female.—Length of idiosoma 134 μ , width 77 μ (holotype). Gnathosoma longer than wide, with ventral setae shorter and more slender than dorsal setae; lacking external setae. Palpal external setae minute. Pharynx slender but slightly swollen at mid portion.

Dorsum (Fig. 14): Dorsal plates of idiosoma with faint minute punctuations. Pseudostigmatic organs capitate, long and slender, attenuate with 1–2 larger spines at apex, generally covered with large spines. Vertical setae short and slender, smooth about $\frac{2}{3}$ as long as seapulars, in some specimens appearing heavier than seapulars. Seapular setae slender, fairly weak, shorter than distance between their insertions. Setae of tergite I slender, lateral pair longer than dorsal pair. Setae of tergites II–IV short and stiff, barbed, with dorsal setae of tergite III slightly longer and heavier than other setae; lateral setae of tergite III appearing shortest.

Venter (Fig. 15): Apodemes complete but somewhat fragile. Anterior median apodeme uninterrupted, disappearing posteriorly before reaching transverse apodeme. Apodemes II straight, medially widely separated from anterior median apodeme. Transverse apodeme areuate. Apodemes III with long, slender lateral extensions. Posterior median apodeme with bifurcate and weak anterior end, straight and uninterrupted posteriorly. Apodemes IV straight, anteriorly uniting with posterior median apodeme, posteriorly extending to coxal setae IV. Coxal setae I, III and IV similarly short and slender. Coxal setae II longer and slightly heavier than other setae, on apodemes II. Caudal setae short and stiff, slender. Metapodosomal lobe broadly rounded.

Legs (Figs. 16, 17): Femora I and II with 3 and 2 setae respectively, each with large ventral triangular flange; dorsal distal seta of femur I conspicuously stout. Tibiotarsus I group of sensilla consisting of 1 clavate and 1 slender stalked capitate solenidia and 1 stout seta; tibiotarsal soleni-



Figs. 14-18. *Tarsonemus blakemorei*, n. sp., female, 14. Dorsum; 15. Venter; 16. Leg I; 17. Leg II; 18. Pseudostigmatic organ.

dion clavate, arising at proximal $\frac{1}{2}$ of tibiotarsus. Tarsus II spinelike seta just laterad of and as long as solenidion. Tibia II with spinelike protuberance distally. Leg IV shorter than combined length of femur-genu and tibia of leg III. Tarsus III shorter than tibia III. Ventral distal spine of tarsi II and III similarly large; that of tarsus I small and slender.

Male and larva.—Unknown.

Holotype.—Female, Middle Grove, Saratoga Co., New York, 29 October 1976, taken from blackbird nest, by E. Blakemore.

Paratypes.—Ten females, with same data as holotype; 10 females, Saratoga, New York, 27 October 1976, taken from flycatcher nest, by E. Blakemore. The holotype and 10 paratypes are deposited in the New York State Museum & Science Service collection at Albany; other paratypes are in the U.S. National Museum in the Acarology Laboratory, Ohio State University, Columbus, Ohio.

Remarks.—*T. blakemorei*, n. sp. is a very small species with a very short leg IV, and a strong ventral flange on femora I and II. It is distinguished from other nest-inhabiting tarsonemids by the presence of the long, lateral extensions of the ventral apodemes III; by the strong and conspicuously stout dorsal distal seta of femur I, by the presence of a spinelike protuberance distally on tibia II, and by the proximal location of the tibiotarsal solenidion. This species is named for its collector, E. Blakemore, of the New York State Museum & Science Service, Albany.

Tarsonemus edwardi, n. sp.

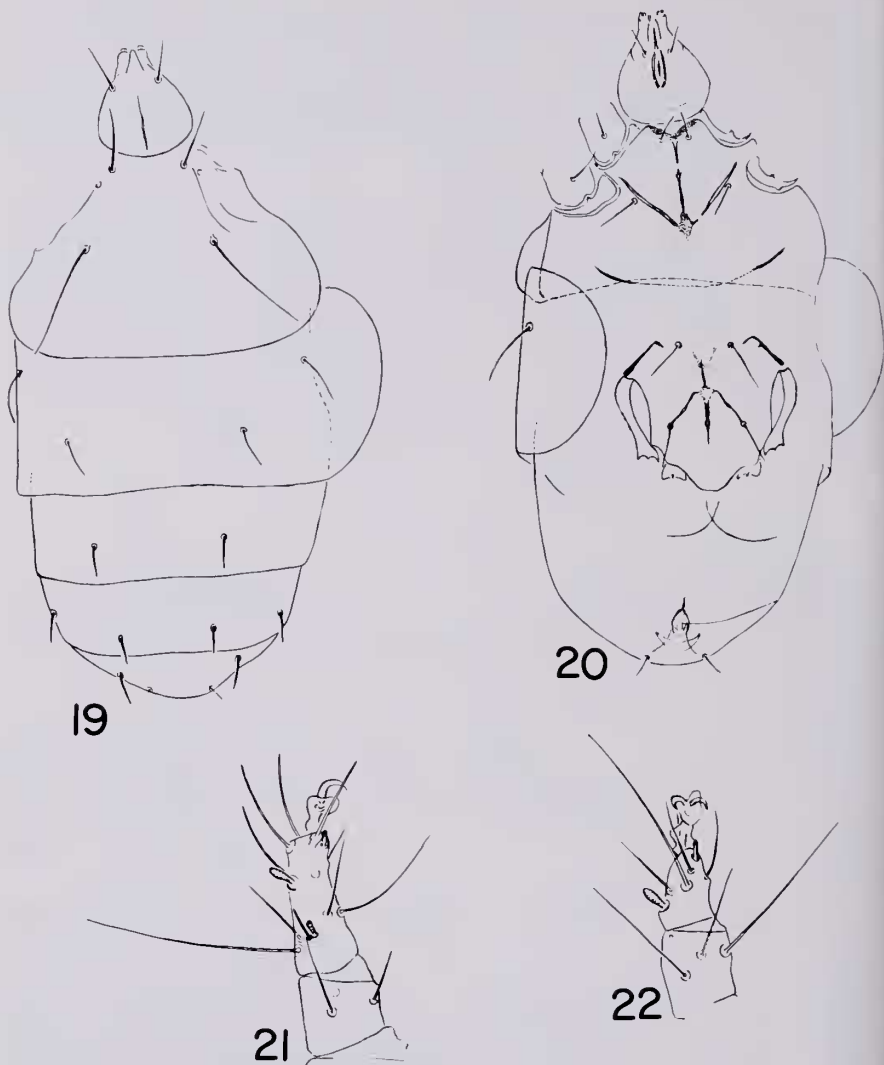
(Figs. 19–31)

Female.—Length of idiosoma 230 μ , width 115 μ (holotype). Gnathosoma longer than wide, almost conical; dorsal setae stouter than ventral setae, equally long; external setae lacking. Palpal external setae minute, spinelike. Pharynx slender, not enlarged.

Dorsum (Fig. 19): Dorsal plates of idiosoma finely punctate. Pseudostigmatic organs capitate, ellipsoidal, spiculate. Vertical setae stout, about $\frac{1}{2}$ as long as scapular setae, finely barbed. Scapular setae slender, slightly longer than distance between their insertions. Setae of tergite I slender, dorsal pair shorter than lateral pair. All setae of tergites II–IV similarly short and stiff.

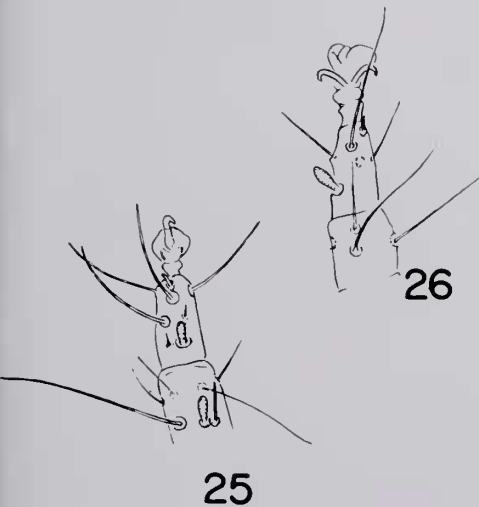
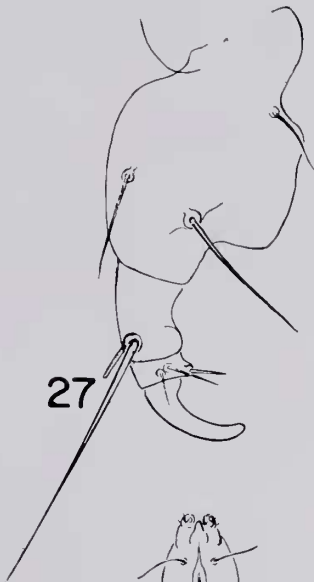
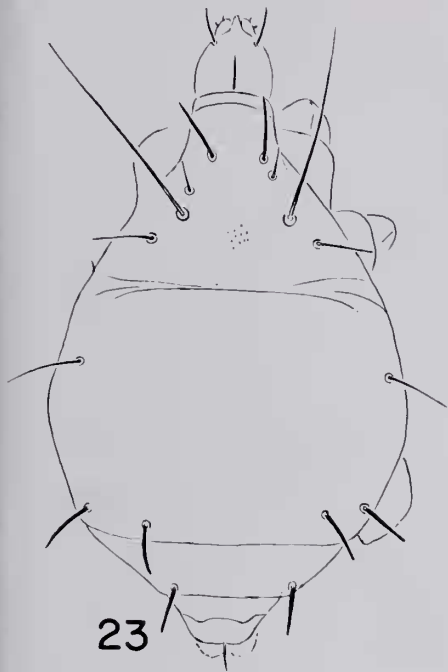
Venter (Fig. 20): Apodemes well developed. Anterior median apodeme interrupted between apodemes I and II, posteriorly weakened at junction of apodemes II, not reaching transverse apodeme. Apodemes II straight, tapering towards and weakening near anterior median apodeme, and not strongly united with it. Transverse apodeme weak, faintly visible except lateral extremities. Apodemes III extending medially near coxal setae III. Anterior end of posterior median apodeme weak, but clearly bifurcate, posteriorly straight and tapering. (In some specimens the bifurcate extremity is lacking.) Apodemes IV crooked, weakly united anteriorly with posterior median apodeme. All coxal setae similarly slender. Coxal setae I posterior to apodemes I, shorter than coxal setae II–IV. Coxal setae II immediately posterior to or on apodemes II. Caudal setae similar to or slightly heavier than coxal setae. Metapodosomal lobe broadly rounded.

Legs (Figs. 21, 22): Femora I and II each with 3 setae, lacking ridge or flange. Tibiotarsus I group of sensilla consisting of 1 small, clavate

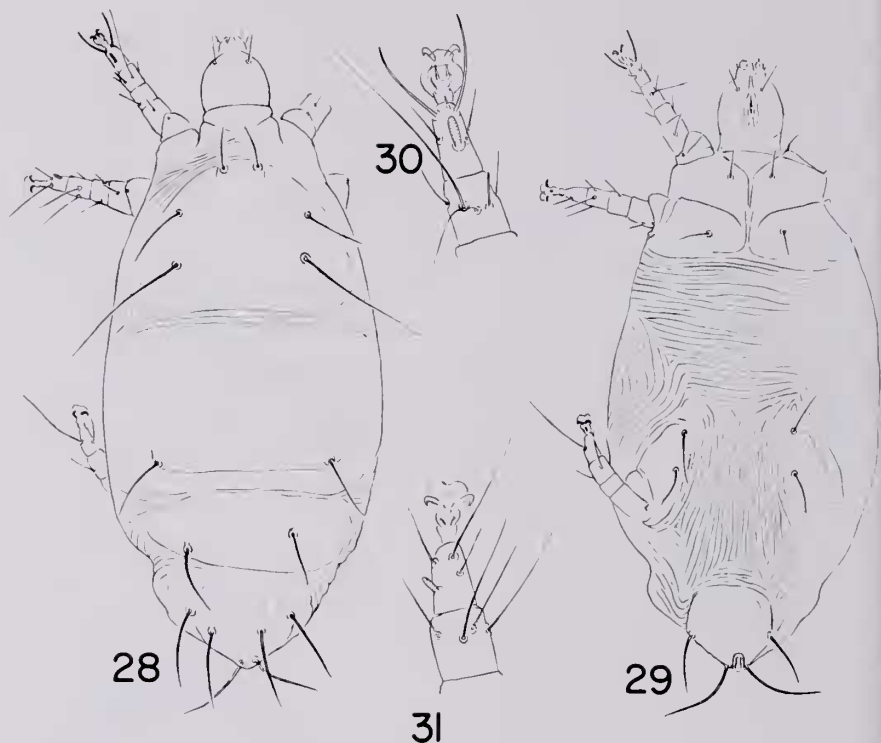


Figs. 19-31. *Tarsonemus edwardi*, n. sp., female, 19. Dorsum; 20. Venter; 21. Tibiotarsus I; 22. Tarsus and tibia II; male, 23. Dorsum; 24. Venter; 25. Tibia and tarsus I; 26. Tibia and tarsus II; 27. Leg IV; larva, 28. Dorsum; 29. Venter; 30. Tibia and tarsus I; 31. Tibia and tarsus II.

solenidion and 1 stout pointed seta; accompanying capitate solenidion lacking, tibiotarsal solenidion arising at distal $\frac{1}{3}$ of tibiotarsus. Tarsus II solenidion slender, clavate, similar to distal solenidion of tibiotarsus I; accompanying seta not spinelike and located distad of solenidion. Leg IV longer than



Figs. 19-31. Continued.



Figs. 19-31. Continued.

combined length of femur-genu and tibia of leg III. Tarsus III about as long as tibia III. Distal ventral spines of tarsi I-III similarly slender.

Male.—Length of idiosoma $204\ \mu$, width $115\ \mu$. Smaller than female, somewhat ellipsoidal. Gnathosomal characters as in female.

Dorsum (Fig. 23).—Dorsal plates of idiosoma finely punctate. Propodosoma with anterior vertical setae stout and stiff, twice as long as posterior vertical pair; posterior vertical setae slender, shortest of setae. Anterior scapular setae stout, longest of setae; posterior scapulars short, slightly longer and heavier than posterior verticals. Three pairs of metapodosomal setae as follows: Anterior lateral setae always longer and more slender than 2 pairs of posterior setae; posterior lateral and dorsal pairs stout, almost equal in length.

Venter (Fig. 24): Apodemes strongly developed. Anterior median apodeme extending posteriorly to transverse apodeme, may be weakened or interrupted at or near junction of apodemes II. Apodemes II curved posteriorly, weakly uniting with anterior median apodeme near its junc-

tion with transverse apodeme. Transverse apodeme with 2 weakened areas. Apodemes III and IV and posterior median apodeme united anteriorly with one another. Posterior median apodeme straight, not bifurcate. Coxal setae I shorter than coxal setae II–IV. Coxal setae III and IV inside coxal plates III.

Legs (Figs. 25, 26, 27): Femora I and III each with 3 setae and ventral ridge. Tibia I group of sensilla lacking capitate solenidion as in female, with 1 fairly large clavate solenidion and 1 stout, pointed seta. Tarsus II solenidion similar in size and shape to corresponding solenidion of tarsus I; accompanying seta not spinelike, distad of solenidion as in female. Femur IV robust, with large flange as figured, inner proximal margin of flange usually straight, distal portion rounded and produced posteriorly; ventral proximal seta shorter than distal seta. Tibia IV with long, rodlike solenidion, about as long as or slightly longer than width of tibia. Ventral distal spine of tarsi I–III similarly small.

Larva.—Idiosoma elongate oval, with weakly sclerotized and poorly defined idiosomal plates. Membranous integument striate.

Dorsum (Fig. 28): Propodosomal vertical setae shorter than medial pair. Scapular setae very long, longest of idiosomal setae. Lateral setae of tergite I slender, as long as dorsal setae. Dorsal setae of tergite I, and all setae of tergites II–IV similarly stout and barbed. Setae of tergite II as long as setae of tergite III. Posterior dorsal pair of tergite IV about twice as long as lateral pair.

Venter (Fig. 29): Apodemes of propodosoma distinct but not well developed. Hysterosomal apodemes lacking. Integument striate. Coxal setae I and II inside coxal plates I and II respectively; coxal setae III and IV inside coxal plates III; all setae smooth and slender.

Legs (Figs. 30, 31): Tibia I group of sensilla consisting of 1 pointed seta, lacking solenidia. Tarsi I and II solenidia clavate. Tarsus II dorsal seta distad of solenidion not spinelike as in female and male. Ventral distal spine of tarsi I–III very small.

Holotype.—Female, Schenectady, New York, 7 July 1976, collected by E. W. Baker & M. Delfinado, in eriophyid galls on leaves of *Acer saccharinum* L.

Paratypes.—Eighteen females, 6 males, Rensselaerville, New York, 7 July, collected by E. W. Baker & M. Delfinado, in eriophyid galls on leaves of *Populus* sp. The holotype and 10 paratypes are deposited in the New York State Museum & Science Service collection at Albany; other paratypes are in the U.S. National Museum collection, and the Acarology Laboratory, Ohio State University, Columbus, Ohio.

Remarks.—The female and male of *T. edwardi*, n. sp. differ from those of *T. acerbilis*, n. sp. in that the leg I group of sensilla consists of only 1 solenidion and 1 seta; the tarsus II seta distad of solenidion is not spine-

like, and femora I and II each have 3 setae. The male has a large flange on femur IV, and a considerably long rodlike solenidion on tibia IV. Other differences can be found in the structure of the ventral apodemes. The larval propodosomal vertical setae are shorter than medial pair, and the tibia I group of sensilla lacks solenidia in *edwardi*.

This species is named for Edward W. Baker, with warmest affection.

Tarsonemus socius, n. sp.

(Figs. 32-34)

Female.—Length of idiosoma 262 μ , width 128 μ (paratype). Gnathosoma longer than wide, with equally strong dorsal and ventral setae, dorsal setae barbed and longer than short smooth ventral setae. Palpal external setae stout, spinelike. Pharynx slender, tubular.

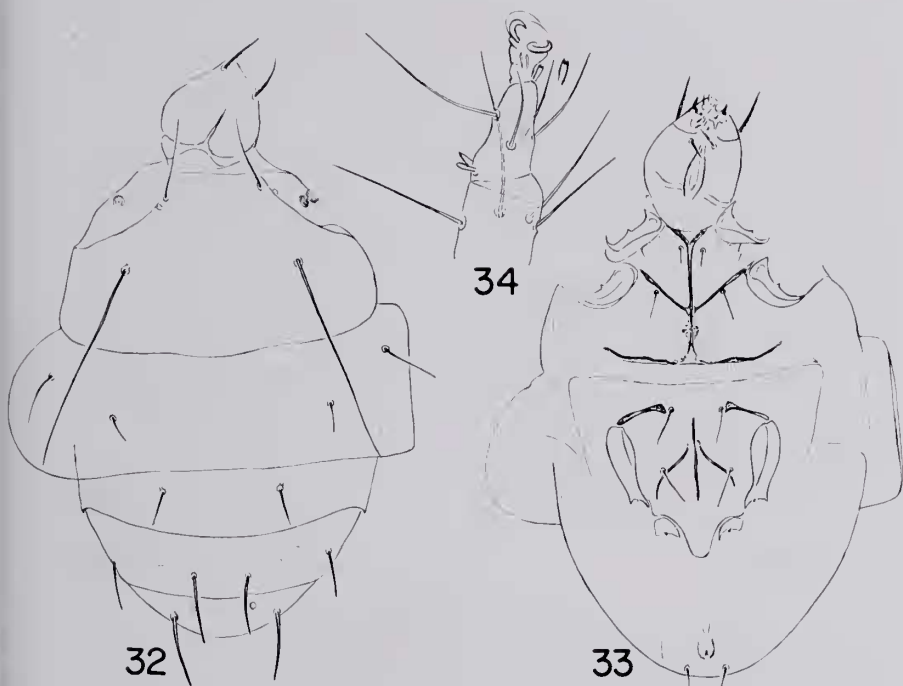
Dorsum (Fig. 32): Dorsal plates of idiosoma minutely punctate. Pseudostigmatic organs capitate, ellipsoidal, spiculate. Vertical setae slender, about $\frac{1}{4}$ as long as scapular setae. Scapular setae longer than distance between their insertions. Lateral setae of tergite I longer than dorsal pair. Setae of tergite II shortest. Dorsal setae of tergite III longer than lateral pair. Setae of tergite IV conspicuously longer and heavier than other setae.

Venter (Fig. 33): Apodemes well developed. Anterior median apodeme uninterrupted, uniting posteriorly with transverse apodeme. Apodemes II straight, tapering near junction of anterior median apodeme and clearly uniting with it. Transverse apodeme straight, with curved lateral extremities, weakened or interrupted medially at junction of anterior median apodeme. Apodemes III extending to coxal setae III. Posterior median apodeme straight, anterior end not bifurcate. Apodemes IV uniting anteriorly with posterior median apodeme, curved posteriorly and extending beyond coxal setae IV. Coxal setae I posterior to apodemes I, shorter than coxal setae II. Coxal setae II on apodemes II, shorter than coxal setae III and IV. Coxal setae III and IV equally long. Caudal setae short and stiff. Metapodosomal lobe narrowly rounded and protruding.

Legs (Fig. 34): Femora I and II with 4 and 3 setae respectively; femur II with ventral ridge. Tibiotarsus I group of sensilla consisting of 1 small clavate and 1 slender stalked capitate solenidia, and 1 stout rodlike seta; distal solenidion slender, clavate. Tarsus II solenidion clavate; spinelike seta large, longer than and slightly distad of solenidion. Leg IV about as long as combined length of femur-genu and tibia of leg IV. Distal ventral spine of tarsi I-III with blunt, dentate tip; spine of tarsus I considerably smaller than others.

Male and larva.—Unknown.

Holotype.—Female, Beltsville, Maryland, 1 June 1976, from milled oats, collected by E. W. Baker & M. Delfinado.



Figs. 32-34. *Tarsonemus socius*, n. sp., female, 32. Dorsum; 33. Venter; 34. Tibia and tarsus II.

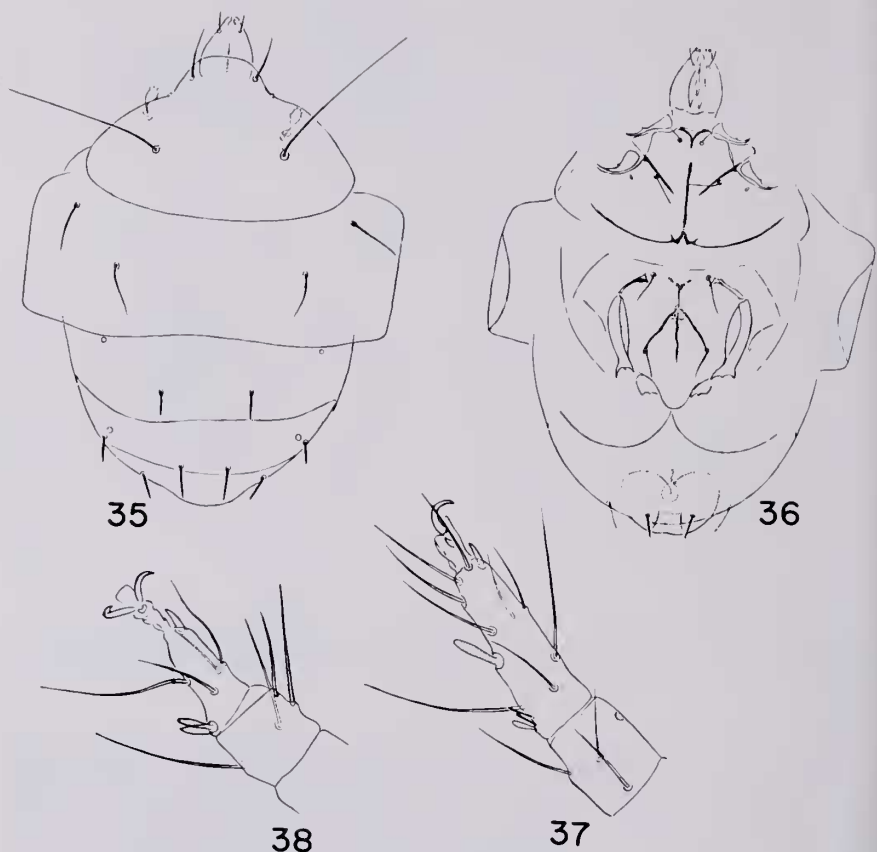
Paratypes.—Two females, with same data as holotype; 1 female, One-squethaw Creek, Albany, New York, 11 April 1976, from bird nest, collected by E. Blakemore. The holotype and 1 paratype are deposited in the New York State Museum & Science Service collection at Albany; 2 paratypes are in the U.S. National Museum collection.

Remarks.—*T. socius*, n. sp. differs from other known stored product and nest inhabiting species by the structure of the ventral apodemes, by the long body setae of tergites III and IV, by the strong gnathosomal and palpal setae, and by the dentate ventral distal spine of tarsi I-III.

Tarsonemus vulgaris, n. sp.
(Figs. 35-38)

Female.—Length of idiosoma 223 μ , width 134 μ (holotype). Gnathosoma longer than wide, with ventral setae shorter than dorsal setae, both pairs slender; lacking external setae. Palpal external setae very small and spinelike. Pharynx swollen at posterior half.

Dorsum (Fig. 35): Dorsal plates of idiosoma uniformly minutely punctate. Pseudostigmatic organs capitate, ellipsoidal, spiculate. Vertical setae



Figs. 35-38. *Tarsonemus vulgaris*, n. sp., female, 35. Dorsum; 36. Venter; 37. Tibiotarsus I; 38. Tibia and tarsus II.

slender, minutely barbed, about $\frac{1}{4}$ as long as scapular setae. Scapular setae longer than distance between their insertions. Setae of tergite I slender, with lateral pair longer than dorsal pair. Setae of tergites II-IV stiff and barbed, with blunt tips. Setae of tergite II shortest. Dorsal and lateral setae of tergite III nearly equal in length, shorter than stout setae of tergite IV.

Venter (Fig. 36): Apodemes well developed. Anterior median apodeme widely interrupted between apodemes I and II, continuing posteriorly to transverse apodeme, with short medial spurs at junction with transverse apodeme. Apodemes II straight, tapering medially but not uniting with anterior median apodeme. Transverse apodeme arcuate, indented medially at junction of anterior median apodeme. Apodemes III medially

extending near coxal setae III. Posterior median apodeme with bifurcate anterior end, weakened or interrupted portion immediately posterior to junction of apodemes IV. Apodemes IV anteriorly uniting with posterior median apodeme, crooked, posteriorly extending to coxal setae IV. All coxal setae slender. Coxal setae I posterior to apodemes I, shorter than coxal setae II. Coxal setae on apodemes II, shorter than coxal setae III. Coxal setae III longest. Coxal setae IV shortest. Caudal setae stiff and barbed, similar in size to setae of tergite III. Metapodosomal lobe small, rounded posteriorly.

Legs (Figs. 37, 38): Femora I and II with 3 and 4 setae respectively. Femur II with ventral flange; femur I lacking flange but with ridge, ventral seta on ridge stout and long, barbed. Tibiotarsus I group of sensilla consisting of 1 clavate and 1 slender capitate solenidia, and 1 stout seta; distal tibiotarsal solenidion arising at distal $\frac{1}{2}$ of tibiotarsus, long and slender, clavate. Tarsus II spinelike seta very large, laterad of clavate solenidion. Leg IV shorter than combined length of femur-genu and tibia of leg III. Ventral distal spine of tarsus II larger than that of tarsi I and III.

Male and larva.—Unknown.

Holotype.—Female, Shaker Road, Albany, New York, 27 May 1975, taken from robin nest, by E. Blakemore.

Paratypes.—One female, with same data as holotype; 9 females, Saratoga and Middle Grove, New York, 26 April, 18 October 1975, taken from Phoebe and blackbird nests, by E. Blakemore; 8 females, Beltsville, Maryland, 1 June 1976, from milled oats, collected by E. W. Baker & M. Delfinado. The holotype and 6 paratypes are deposited in the New York State Museum & Science Service collection at Albany; other paratypes are deposited in the U.S. National Museum collection, and the Acarology Laboratory, Ohio State University, Columbus, Ohio.

Remarks.—The female of this species has many characters in common with that of *T. insignis* Delfinado, including the strong, barbed setae on the ventral ridge of femur I. *T. vulgaris*, n. sp., however, may be readily distinguished by the presence of short medial spurs at the junction of the anterior median and transverse apodemes, the transverse apodeme being indented at its junction with the anterior median apodeme.

The following species listed below are additional records from stored grain material; they have been previously found in nest habitat from New York (Delfinado, 1976).

Tarsonemus ascitus Delfinado, 1976

Additional records.—Two females, Onesquethaw Creek and Shaker Road, Albany, New York, 11 April, 27 May 1976, from robin nests; 1 female, Green Co., New York, 14 August 1976, from bracket fungi, all collected by E. Blakemore. Three females, Beltsville, Maryland, 1 June 1976, from milled oats, collected by E. W. Baker & M. Delfinado.

Tarsonemus confusus Ewing, 1939

Additional records.—Two females, Cambridge, and 5 females, Rensselaerville, New York, 24, 26 August 1976, from corn feed, collected by R. Means; 15 females, Shaker Road, Albany and Middle Grove, Saratoga, New York, 26 April, 27 May, 18 October 1976, from robin and Phoebe nests, collected by E. Blakemore. Five females, Beltsville, Maryland, 1 June 1976, from milled oats, collected by E. W. Baker & M. Delfinado.

Tarsonemus granarius Lindquist, 1972

Additional records.—Three females, Shaker Road, Albany, New York, 27 May 1976, from robin nests, collected by E. Blakemore; 2 females, Cambridge, New York, 21 April 1976, from nest in bird house, collected by M. Delfinado; 2 females, Rensselaerville, New York, 26 August 1976, from corn feed, collected by R. Means; 3 females, Huntington, Long Island, New York, September 1975, from wild oats packing material, collected by M. Delfinado.

Tarsonemus imitatus Delfinado, 1976

Additional records.—Three females, Beltsville, Maryland, 2 June 1976, from milled oats, collected by E. W. Baker & M. Delfinado.

Tarsonemus waitei Banks, 1904

Additional records.—Two females, Shaker Road, Albany, New York, 27 May 1976, from robin nests, collected by E. Blakemore; 2 females, Cambridge, New York, 8 August 1976, from corn feed, collected by R. Means.

Key to Female *Tarsonemus* from New York

1. Apodemes III extending laterally beyond trochanters III (Fig. 15); scapular setae shorter than distance between their insertions 2
- Apodemes III not extending laterally beyond trochanters III (Figs. 2, 20, 33, 36); scapular setae longer than or as long as distance between their insertions 4
2. Lateral extensions of apodemes III with characteristic scalloped or uneven posterior edges; body surfaces heavily and conspicuously punctate *ascitus* Delfinado
- Lateral extensions of apodemes III simple; body punctations minute and inconspicuous 3
3. Femora I and II each with prominent ventral flange (Fig. 17); tibia II with spinelike protuberance distally; anterior median apodeme uninterrupted between apodemes I and II; lateral extensions of apodemes III long, peglike *blakemorei*, n. sp.

- Only femur II with ventral flange; tibia II without protuberance; anterior median apodeme interrupted between apodemes I and II; lateral extensions of apodemes III short, spurlike
praesignis Delfinado
- 4. Gnathosoma with ventral apodemes
fusarii Cooreman 5
- Gnathosoma without ventral apodemes
- 5. Tarsus II spinelike seta absent or not developed (Fig. 22) 6
- Tarsus II with large spinelike seta usually laterad of solenidion (Figs. 4, 17, 34, 38) 9
- 6. Tibiotarsus I group of sensilla consisting of 1 solenidion and 1 rodlike seta (Fig. 21) 7
- Tibiotarsus I group of sensilla consisting of 2 solenidia and 1 rodlike seta
granarius Lindquist
- 7. Metapodosomal lobe elongate, produced posteriorly; anterior median apodeme diffused immediately posterior to apodemes II; apodemes II curved medially, clearly not uniting with anterior median apodeme
cryptocephalus (Ewing)
- Metapodosomal lobe broadly rounded; anterior median apodeme diffused before or at posterior level of apodemes II; apodemes II straight, ending at diffused area of anterior median apodeme, not strongly uniting with it 8
- 8. Anterior median apodeme interrupted between apodemes I and II; transverse apodeme weak except lateral extremities; posterior median apodeme extending posteriorly beyond junction of apodemes IV; found in eriophyid galls
edwardi, n. sp.
- Anterior median apodeme not interrupted; transverse apodeme strong, with 2 short weakened or interrupted areas at middle; posterior median apodeme weak, not extending anteriorly; found in large numbers in bird nests
waitei Banks
- 9. Transverse apodeme strong and well defined 11
- Transverse apodeme weak and indistinct at middle, strong at lateral extremities 10
- 10. Setae of tergite IV unusually long, 2-3 times as long as other hysterosomal setae; posterior median apodemes short, not bifurcate anteriorly
dubius Delfinado
- Setae of tergite IV as long as lateral setae of tergite III, slightly longer and stronger than other setae; posterior median apodeme weak anteriorly but clearly bifurcate
imitatus Delfinado
- 11. Transverse apodeme wavy or with 2 indentations at middle; anterior median apodeme diffused at posterior level of apodemes II
confusus Ewing
- Transverse apodeme arcuate or with a notch at middle where it joins anterior median apodeme; anterior median apodeme well defined or diffused shortly before reaching transverse apodeme 12

12. Anterior median apodeme interrupted or weakened between apodemes I and II 13
 - Anterior median apodeme continuous, not interrupted 18
13. Spinelike seta of tarsus II very large, hyaline and with black pointed tip, considerably larger than solenidion (Fig. 4); found in eriophyid galls *acerbilis*, n. sp.
 - Spinelike seta of tarsus II as normal spine (Figs. 17, 34, 38); mostly found in nests and stored grain 14
14. Femur II with ventral flange; anterior median apodeme broadly interrupted between apodemes I and II 15
 - Femur II without ventral flange; anterior median apodeme narrowly interrupted or weakened between apodemes I and II 17
15. Ventral seta on ridge of femur I slender, inconspicuously barbed; flange of femur II small and not as developed as in related species *smileyi* Delfinado
 - Ventral seta on ridge of femur I stout and barbed 16
16. Transverse apodeme medially indented and with short spurs at junction with anterior median apodeme *vulgaris*, n. sp.
 - Transverse apodeme simple *insignis* Delfinado²
17. Anterior median apodeme strong and well defined posteriorly; posterior median apodeme normally bifurcate anteriorly; metapodosomal lobe small, attenuate posteriorly; bursa copulatrix globular *talpae* Schaarsehmidt
 - Anterior median apodeme posteriorly weakened or diffused between apodemes II and transverse apodeme; posterior median apodeme with broad cellular neck between anterior fork and junction of posterior median apodemes; metapodosomal lobe small, narrowed posteriorly; bursa copulatrix elongate *neotalpae* Delfinado
18. Femur II with ventral flange 19
 - Femur II without flange 20
19. Femur I with prominent ventral flange similar to that of femur II; setae of tergites II-IV similarly stout, with blunt tips *nidicolus* Delfinado
 - Femur I with small flange appearing as ventral ridge; all setae of tergites I-IV similarly slender and short *similis* Delfinado
20. Setae of tergite II shorter and more slender than setae of tergites III and IV; dorsal setae of tergite III longer than lateral pair; distal ventral spine of tarsi I-III with blunt, dentate tip; palpal external setae stout and spinelike *socius*, n. sp.
 - Setae of tergite II similar to other hysterosomal setae; dorsal setae of tergite III shorter than lateral pair; palpal external setae minute; ventral distal spine of tarsi I-III not dentate *irregularis* Delfinado

A checklist of tarsonemid mites presently known from New York:

1. *Steneotarsonemus chionaspivorus* (Ewing), 1911
2. *S. friedmani* Smiley, 1967
3. *S. oconnori* Delfinado, 1976³
4. *S. pallidus* (Banks), 1899
5. *Tarsonemus acerbilis*, n. sp.
6. *T. ascitus* Delfinado, 1976
7. *T. blakemorei*, n. sp.
8. *T. confusus* Ewing, 1939
9. *T. cryptocephalus* (Ewing), 1939
10. *T. dubius* Delfinado, 1976³
11. *T. edwardi*, n. sp.
12. *T. fusarii* Cooreman, 1941
13. *T. granarius* Lindquist, 1972
14. *T. imitatus* Delfinado, 1976³
15. *T. insignis* Delfinado, 1976
16. *T. irregularis* Delfinado, 1976
17. *T. neotalpae* Delfinado, 1976
18. *T. nidicolus* Delfinado, 1976
19. *T. praesignis* Delfinado, 1976
20. *T. similis* Delfinado, 1976
21. *T. smileyi* Delfinado, 1976³
22. *T. socius*, n. sp.
23. *T. talpae* Schaarschmidt, 1959
24. *T. waitei* Banks, 1904
25. *T. vulgaris*, n. sp.
26. *Xenotarsonemus viridis* (Ewing), 1939
27. *Iponemus confusus oriens* Lindquist, 1969.

Literature Cited

- Banks, N. 1899. *Tarsonemus* in America. Proc. Entomol. Soc. Wash. 4:294-296.
- Beer, R. E. 1954. A revision of the Tarsonemidae of the Western Hemisphere (Order Acarina). Kansas Univ. Sci. Bull. 36:1091-1387.
- . 1963. Social parasitism in the Tarsonemidae, with description of a new species of tarsonemid mite involved. Ann. Entomol. Soc. Am. 56:153-160.
- Cooreman, J. 1941. Un tarsonemide mycophage nouveau (Acarien). Bull. Mus. r. Hist. nat. Belg. 17:1-7.
- Delfinado, M. D. 1976. Terrestrial mites of New York—V. Tarsonemidae. Jour. N.Y. Entomol. Soc. 84:255-274.
- Ewing, H. E. 1911. New predaceous and parasitic Acarina. Psyche (Camb.) 18:37-43.
- . 1939. A revision of the mites of the subfamily Tarsoneminae of North America, the West Indies, and the Hawaiian Islands. U.S. Dept. Agr. Tech. Bull. 653:1-63.
- Lindquist, E. E. 1968. Review of Holarctic tarsonemid mites (Acarina: Pro-

- stigmata) parasitizing eggs of ipine beetles. Mem. Entomol. Soc. Can. 60: 2-111.
- . 1972. A new species of *Tarsonemus* from stored grain (Acarina: Tarsonemidae). Can. Entomol. 104:1699-1708.
- Schaarschmidt, L. 1959. Systematik und Ökologie der Tarsonemiden. Beitr. Syst. u. Ökol. Mitteleurop. Acarina 1(2):713-823.
- Smiley, R. L. 1967. Further studies on the Tarsonemidae (Acarina). Proc. Entomol. Soc. Wash. 69:127-146.

New York State Museum & Science Service, Albany, New York 12234.

Received for publication 31 May 1977.

Footnotes

¹Published by Permission of the Director, New York State Science Service, Journal Series No. 233.

²This species has no spurlike lateral extensions of apodemes III as inadvertently mentioned on p. 267 (Delfinado, 1976).

³Additional paratypes are deposited in the Cornell University Insect Collection, Ithaca, New York.